

September 29, 2017

Mr. Anthony Krone Risk Manager Shelby County Schools 160 South Hollywood – Room 152 Memphis, Tennessee 38112

RE: Lead in Drinking Water Post-Flush Sampling
Westwood High School
4480 Westmont Road
Memphis, Tennessee
Tioga Project No.: 24816.02

Dear Mr. Krone,

At the request of Shelby County Schools (the Client), Tioga Environmental Consultants (Tioga) performed sampling of drinking water sources at Westwood High School for laboratory analysis of total lead concentrations.

As first-draw sampling of drinking water sources at this school on September 12th, 2017 revealed the potential for elevated lead levels in the potable water system, Tioga recommended additional sampling of all water fountains in the school to determine the extent of the issue. Following the receipt of the laboratory analytical results from the initial sampling event, Tioga informed Shelby County Schools Risk Management personnel, who instructed maintenance personnel to take the water fountains at this school out of service pending further testing. Prior to this post-flush sampling event, the water fountains throughout the school had been shut off for multiple weeks.

Initial flush sampling of refrigerated water fountains identified during the previous first-draw sampling as having elevated lead levels in the drinking water was conducted on the evening of September 25th, 2017. Prior to sample collection, these refrigerated water fountains were flushed for 15 minutes in order to completely drain the internal holding tanks and obtain samples of water from the lines feeding the fountains.

On September 26th, 2017, all non-refrigerated water sources identified during the first draw sampling event were sampled to obtain samples from the lines feeding the fountains. Additionally, first draw samples were collected from the refrigerated water fountains sampled the night before, to evaluate the water that was stored in the unit overnight. Sampling was conducted early in the morning, before any potable water sources had been used for the day and prior to the arrival of any students or faculty. Maintenance personnel reactivated the water fountains prior to sampling, and the fountains were flushed for 30 seconds before sample collection, and the water fountains were deactivated and taken out of service immediately following the sampling. One additional sample was also collected from the

Shelby County Schools Drinking Water Post-Flush Sampling Westwood High School September 29, 2017

supply at the point of entry to the building. This line was also flushed for 30 seconds prior to sample collection.

The EPA has established an action level for public water supply systems at 15 micrograms of lead per liter of water (15 μ g/L). Further, EPA recommends that schools remove water fountains and other outlets used for consumption if lead levels exceed 20 μ g/L. Though this school uses water from the municipal water supply and therefore does not qualify as a public water supply system, Tioga recommends that the more conservative EPA action level of 15 μ g/L be used in the decision making process as to the continued operation of the potable water sources at the school.

Results Based on Laboratory Analysis:

Table 1 on the following page summarizes the sampling locations, laboratory analytical results, and EPA action level for lead in drinking water. Sample results with a "<" symbol did not contain lead content above the laboratory detection limit. Samples highlighted in yellow exceeded the EPA action level for lead. A dash indicates that a sample was not collected. This table includes results from both the first draw sampling performed on September 12, 2017 and the follow-up flush sampling performed on September 25 and 26.

Table 1 **Summary of Analytical Results - Westwood High School**

	Odiffinally of Affairstical Results W	ootwood ing.	. 00.100.		
Sample ID	Sample Location	First Draw Sampling Lead (9/12/2017) (µg/L)	Post 15- Minute Flush Sampling Lead (µg/L)	Post 30- Second Flush Sampling Lead (µg/L)	EPA Action Level (μg/L)
32-1	White Water Fountain Across from Art Room	658	-	24.1	
32-2	Gray Water Fountain Across from Art Room	2.53	-	-	
32-3	Water Fountain Across from Room 218	9.74	-	-	
32-4	Water Fountain Across from Room 213	20.0	-	6.78	
32-5	Water Fountain Across from Room 209	121	-	2.31	
32-6	Water Fountain Across from Room 205A	227	0.758	<0.500*	
32-7	Water Fountain Across from Room 201	12.7	-	-	
32-8	Water Fountain Across from Room 115	25.7	-	4.74	
32-9	Water Fountain Across from Room 116 (Cooler)	36.5	2.37	57.8*	
32-10	Water Fountain Across from Room 126	14.4	-	-	
32-11	Water Fountain Next to Boys' Room Lobby	13.2	-	-	
32-12	Water Fountain Next to Room 136	2.99	-	-	15
32-13	Water Fountain Across from Room 101	23.9	-	3.24	15
32-14	Water Fountain Across from Room 107	10.0	-	-	
32-15	Water Fountain Across from Room 111	66.8	0.738	2.89*	
32-16	Water Fountain Next to Mechanical Room	8.81	-	-	
32-17	Water Fountain Between Rooms 124A & 124B	28.4	2.07	3.84*	
32-18	Water Fountain Right of Room 124B	289	< 0.500	12.6*	
32-19	Water Fountain Between Bathroom Next to VOC1	77.8	<0.500	1.29*	
32-20	SAA Bathroom Water Fountain	10.6	-	-	
32-21	Water Fountain in Gym Lobby	82.6	<0.500	1.00*	
32-22	Short Water Fountain in Gym Lobby (Broken- No Sample)	NA	-	-	
32-23	ROTC Water Fountain	0.792	-	-	
32-SL	Supply Line at Building Entry	-	-	5.68	

(μg/L) = Micrograms of lead per liter of water (parts per billion)

* These samples were collected as a first draw on refrigerated water fountains

^{- =} Not Sampled

Shelby County Schools Drinking Water Post-Flush Sampling Westwood High School September 29, 2017

A review of the laboratory analytical results of the water samples collected during the postflush sampling revealed two samples with total lead concentrations above the EPA action level for drinking water. The sample collected from the supply line at the point of entry to the building was below the EPA action level for lead.

Recommendations:

Based upon the laboratory analytical results of the potable water samples collected from Westwood High School, Tioga recommends that the two water sources identified in the table above that exceeded the EPA action level during the Post 30-Second Flush Sampling event be removed from service and the associated water supply line capped, as post-flush sampling results indicate a source of lead contamination in the immediate water supply system for the fountain and in the storage area of the refrigerated water fountain. Any water fountain built or installed before 1988 has a greater potential for containing lead piping, lead based parts and materials, and/or lead based solder. Particular care in the flushing, monitoring, and maintenance of these water fountains should be taken due to the lack of regulation concerning lead containing materials used during water fountain construction, installation, and maintenance.

The EPA provides technical guidance for reducing lead in drinking water in schools published in the October 2006 revision of the "3Ts for Reducing Lead in Drinking Water in Schools". Tioga recommends that a plan be developed and implemented in accordance with this guidance for flushing of potable water sources not subject to removal with elevated lead levels in first-draw samples, especially following extended periods of non-use such as weekends, holidays, and breaks.

Limitations

Potable water sources with elevated lead levels may potentially be present in areas of the property that are not addressed with this report. This investigation only included the potable water sources specifically addressed.

We appreciate the opportunity to provide you with this service. Should you have any questions regarding this report, please contact me at (901) 791-2432.

Sincerely,

TIOGA ENVIRONMENTAL CONSULTANTS, INC.

Margaret F. Strom, QEP, CHMM

President

Enclosure: (1) Laboratory Analytical Report



9/28/2017

Tioga Environmental Consultants Mr. Eric Davis 357 North Main Street Memphis, TN, 38103

Ref: **Analytical Testing**

> Lab Report Number: 17-269-0299 Client Project Description: 32 - Flush

Memphis, TN Project #24816.02

Dear Mr. Eric Davis:

Waypoint Analytical, Inc. received sample(s) on 9/26/2017 for the analyses presented in the following report.

The above referenced project has been analyzed per your instructions. The analyses were performed in accordance with the applicable analytical method.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, method validations, instrumentation maintenance and calibration for all parameters (NELAP and non-NELAP) were performed in accordance with guidelines established by the USEPA (including 40 CFR 136 Method Update Rule May 2012) and NELAC unless otherwise indicated. Any parameter for which the laboratory is not officially NELAP accredited is indicated by a '~' symbol. These are not included in the scope because NELAP accreditation is either not available or has not been applied for. Additional certifications may be held/are available for parameters, where NELAP accreditation is not required or applicable. A full list of certifications is available upon request.

Certain parameters (chlorine, pH, dissolved oxygen, sulfite...) are required to be analyzed within 15 minutes of sampling. Usually, but not always, any field parameter analyzed at the laboratory is outside of this holding time. Refer to sample analysis time for confirmation of holding time compliance.

The results are shown on the attached Report of Analysis(s). Results for solid matrices are reported on an asreceived basis unless otherwise indicated. This report shall not be reproduced except in full and relates only to the samples included in this report.

Please do not hesitate to contact me or client services if you have any questions or need additional information.

Sincerely,

Randy Thomas Project Manager

Rendell H. Thomas

Laboratory's liability in any claim relating to analyses performed shall be limited to, at laboratory's option, repeating the analysis in question at laboratory's expense, or the refund of the charges paid for performance of said analysis.

Mississippi Kentucky #90047

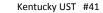
Alabama #40750 Louisiana California Tennessee #TN02027

#04015 #2904

VA NELAP #460181 #415 EPA #TN00012

#T104704180-11-6 Texas Oklahoma #9311

Arkansas #88-0650 Virginia #00106







06510

Tioga Environmental Consultants

Mr. Eric Davis 357 North Main Street Memphis, TN 38103 Project 32 - Flush Information : Memphis, TN

Project #24816.02

Report Date: 9/28/2017

Lab No: 96860 Matrix: Aqueous

Sample ID: **32-6-F** Sampled: **9/25/2017 16:43**

Test Results Units MQL DF Date / Time Bv Analytical **Analyzed** Method Total Lead 0.758 μg/L 0.500 1 09/27/17 21:41 CCR EPA-200.8

Lab No: 96861 Matrix: Aqueous

Sample ID : **32-9-F** Sampled: **9/25/2017 16:52**

DF MQL Date / Time Test Results Units By Analytical Analyzed Method Total Lead EPA-200.8 2.37 μg/L 0.500 1 09/27/17 21:43 CCR

Lab No : 96862 Matrix: Aqueous

Sample ID: **32-15-F** Sampled: **9/25/2017 16:46**

Results Units MQL DF Date / Time Analytical Test By **Analyzed** Method Total Lead EPA-200.8 0.738 μg/L 0.500 1 09/27/17 21:44 CCR

Lab No: 96863 Matrix: Aqueous

Sample ID : **32-17-F** Sampled: **9/25/2017 17:12**

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	2.07	μg/L	0.500	1	09/27/17 21:45	CCR	EPA-200.8	

Qualifiers/ Definitions

DF

Dilution Factor

MQL



06510

Tioga Environmental Consultants

Mr. Eric Davis 357 North Main Street Memphis, TN 38103 Project 32 - Flush Information : Memphis, TN

Project #24816.02

Report Date: 9/28/2017

Lab No: 96864 Matrix: Aqueous

Sample ID: **32-18-F** Sampled: **9/25/2017 17:10**

Test Results Units MQL DF Date / Time Bv Analytical **Analyzed** Method Total Lead < 0.500 μg/L 0.500 1 09/27/17 21:47 CCR EPA-200.8

Lab No: 96865 Matrix: Aqueous

Sample ID: **32-19-F** Sampled: **9/25/2017 17:22**

DF MQL Date / Time Test Results Units By Analytical Analyzed Method Total Lead EPA-200.8 < 0.500 μg/L 0.500 1 09/27/17 21:48 CCR

Lab No: 96866 Matrix: Aqueous

Sample ID : **32-21-F** Sampled: **9/25/2017 17:30**

Results Units MQL DF Date / Time Analytical Test By **Analyzed** Method Total Lead EPA-200.8 < 0.500 μg/L 0.500 1 09/27/17 21:49 CCR

Lab No: 96867 Matrix: Aqueous

Sample ID : **32-1-F2** Sampled: **9/26/2017 6:03**

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	24.1	μg/L	0.500	1	09/27/17 21:54	CCR	EPA-200.8	

Qualifiers/ Definitions DF

Dilution Factor

MQL



06510

Tioga Environmental Consultants

Mr. Eric Davis 357 North Main Street Memphis, TN 38103 Project 32 - Flush Information : Memphis, TN

Project #24816.02

Report Date: 9/28/2017

Lab No: 96868 Matrix: Aqueous

Sample ID : **32-4-F2** Sampled: **9/26/2017 5:59**

Test Results Units MQL DF Date / Time Bv Analytical **Analyzed** Method Total Lead 6.78 μg/L 0.500 1 09/27/17 21:56 CCR EPA-200.8

Lab No: 96869 Matrix: Aqueous

Sample ID : **32-5-F2** Sampled: **9/26/2017 5:56**

DF MQL Date / Time Test Results Units By Analytical Analyzed Method Total Lead EPA-200.8 2.31 μg/L 0.500 1 09/27/17 21:57 CCR

Lab No : 96870 Matrix: Aqueous

Sample ID: 32-6-F2 Sampled: 9/26/2017 5:54

Results Units MQL DF Date / Time Analytical Test By **Analyzed** Method Total Lead EPA-200.8 < 0.500 μg/L 0.500 1 09/27/17 21:58 CCR

Lab No: 96871 Matrix: Aqueous

Sampled: 9/26/2017 6:16

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	4.74	μg/L	0.500	1	09/27/17 21:59	CCR	EPA-200.8	

Qualifiers/ Definitions DF

Dilution Factor

MQL



06510

Tioga Environmental Consultants

Mr. Eric Davis 357 North Main Street Memphis, TN 38103 Project 32 - Flush Information : Memphis, TN

Project #24816.02

Report Date: 9/28/2017

Lab No: 96872 Matrix: Aqueous

Sample ID: 32-9-F2 Sampled: 9/26/2017 6:13

Test Results Units MQL DF Date / Time Bv Analytical **Analyzed** Method Total Lead 57.8 μg/L 0.500 1 09/27/17 22:12 CCR EPA-200.8

Lab No: 96873 Matrix: Aqueous

Sample ID : **32-13-F2** Sampled: **9/26/2017 6:09**

DF MQL Date / Time Test Results Units By Analytical Analyzed Method Total Lead EPA-200.8 3.24 μg/L 0.500 1 09/27/17 22:14 CCR

Lab No : 96874 Matrix: Aqueous

Sample ID: 32-15-F2 Sampled: 9/26/2017 6:07

Results Units MQL DF Date / Time Analytical Test By **Analyzed** Method Total Lead EPA-200.8 2.89 μg/L 0.500 1 09/27/17 22:15 CCR

Lab No: 96875 Matrix: Aqueous

Sample ID: **32-17-F2** Sampled: **9/26/2017 5:36**

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	3.84	μg/L	0.500	1	09/27/17 22:16	CCR	EPA-200.8	

Qualifiers/ Definitions

DF

Dilution Factor

MQL



06510

Tioga Environmental Consultants

Mr. Eric Davis 357 North Main Street Memphis, TN 38103 Project 32 - Flush Information : Memphis, TN

Project #24816.02

Report Date: 9/28/2017

Lab No: 96876 Matrix: Aqueous

Sample ID : **32-18-F2** Sampled: **9/26/2017 5:35**

Test Results Units MQL DF Date / Time Bv Analytical **Analyzed** Method Total Lead 12.6 μg/L 0.500 1 09/27/17 22:18 CCR EPA-200.8

Lab No: 96877 Matrix: Aqueous

Sample ID: **32-19-F2** Sampled: **9/26/2017 5:41**

DF MQL Date / Time Test Results Units By Analytical Analyzed Method Total Lead EPA-200.8 1.29 μg/L 0.500 1 09/27/17 22:19 CCR

Lab No : 96878 Matrix: Aqueous

Sample ID: 32-21-F2 Sampled: 9/26/2017 5:48

Results Units MQL DF Date / Time Analytical Test By **Analyzed** Method Total Lead EPA-200.8 1.00 μg/L 0.500 1 09/27/17 22:20 CCR

Lab No: 96879 Matrix: Aqueous

Sample ID : **32-SL** Sampled: **9/26/2017 5:32**

Test	Results	Units	MQL	DF	Date / Time Analyzed	Ву	Analytical Method	
Total Lead	5.68	μg/L	0.500	1	09/27/17 22:22	CCR	EPA-200.8	_

Qualifiers/ Definitions

DF

Dilution Factor

MQL



Signature: Danyale Love

2790 Whitten Road, Memphis, TN 38133 Main 901.213.2400 ° Fax 901.213.2440 www.waypointanalytical.com

Cooler Receipt Form

Customer Number: 06510

Customer Name: Tioga Environmental Consultants

Report Number: 17-269-0299

Shipping Method

○ Fed Ex ○ UPS	US PostalClient	◯ Lab	ar.	Other:	NA	
			•		INA	
	ner/cooler uncomprom	ised?	Yes	<u> </u>		
Number of cool	ers received		1			
Custody seals in	ntact on shipping conta	ainer/cooler?	O Yes	○ No		t Required
Custody seals in	ntact on sample bottles	s?	O Yes	○ No	● No	t Required
Chain of Custoo	dy (COC) present?		Yes	○ No		
COC agrees wit	th sample label(s)?		Yes	○ No		
COC properly c	ompleted		Yes	○ No		
Samples in prop	per containers?		Yes	○ No		
Sample contain	ers intact?		Yes	○ No		
Sufficient samp	le volume for indicated	test(s)?	Yes	○ No		
All samples reco	eived within holding tin	ne?	Yes	○ No		
Cooler tempera	ture in compliance?		Yes	○ No		
	s arrived at the laborate considered acceptable gun.		○ Yes	No		
Water - Sample	containers properly p	eserved	Yes	○ No	○ N/A	Α
Water - VOA via	als free of headspace		O Yes	○ No	● N/A	Ą
Trip Blanks rece	eived with VOAs		O Yes	○ No	● N/A	A
Soil VOA metho	od 5035 – compliance o	criteria met	O Yes	○ No	● N/A	4
High concen	tration container (48 h	r)	Lo	w concentration En	Core sample	rs (48 hr)
High concen	tration pre-weighed (m	ethanol -14 d)	Lo	w conc pre-weighed	vials (Sod E	Bis -14 d)
Special precaut	ions or instructions inc	luded?	O Yes	● No		
Comments:						

Page 7 of 10

Date & Time: 09/26/2017 15:25:33



32-17-F2

2790 Whitten Road, Memphis, TN 38133 Main 901.213.2400 ° Fax 901.213.2440

Kit ID: 0000085992
Initiated By: Andy Parrish
Initiated Date: 9/8/2017
Project Comment

CHAIN-OF-CUS



Tioga Environmental Consultants 32 - Flush

Plastic - Pint

NONE

Total Lead/DW

17-269-0299 06510 09-26-2017 15:23:25

Company N	Name Inmental Cons	ultants	Company Number 06510			ric	Manager/Contact		Purchase	Order Number		
Site Name	TIUS!	h	Project Number 24816.0		Special Detection Limits(s) Date Results Needed Project Manager Email		Method of Shipment Fed Ex UPS UPS Courier Client Drop CO Other Site/Facility ID #		UPS USPS			
			(901) 791-2432			0 10	ours			-Flush		
Date	Time	*	Sample ID	Matrix	Grab/ Comp	# of Cont	Container Type	Preservation		Preservation		Analyses
7/26/17	0554	32.	-6-F2	Aqueous	G	1	Plastic - Pint	N	IONE	Total Lead/DW		
	0616	32	8-F2	Aqueous	6	1	Plastic - Pint	N	ONE	Total Lead/DW		
	0613	32	-9-F2	Aqueous	G	1	Plastic - Pint	N	ONE	Total Lead/DW		
	0609	32	-13-F2	Aqueous	G	1	Plastic - Pint	N	ONE	. Total Lead/DW		
	0607	32	-15-F2	Aqueous	6	1	Plastic - Pint	N	ONE	Total Lead/DW		

	For Laborato	ry Use Only	Sampled by (Name - Print)	Client Remark	s/Comments	
Ice	Custody	Lab Comments	Lake Hall	Rush	24-hr IAT	
Y/N)	Seals Y/N		Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time
Blank/Co	oler Temp		1, 1,	Date Time	Received by: (SIGNATURE)	Date Time
			Relinguished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Part Time

Aqueous



Kit ID: 0000085412
Initiated By: Andy Parrish
Initiated Date: 8/28/2017
Project Comment

CHAIN-OF-CUS



Tioga Environmental Consultants 32 - Flush 17-269-0299 06510 09-26-2017 15:23:25

Company N	lame		Company Number				Manager/Contact		Purchase C	Order Number
Γioga Enviro	nmental Consi	ultants	06510		Mr. Luke Hall					
Site Name	-Flosi	^	Project Number 24816.02	_	RUSH – Additional charges apply Special Detection Limits(s) Date Results Needed				Method of Shipment Fed Ex UPS USPS Courier Client Drop Off Other	
LIMS Project ID			Project Manager Phone (901) 791-2432	Project Manager Email Acus Thought Com That Manager Email				Site/Facility ID# 32 Flush		
Date	Time		Sample ID	Matrix	Grab/ Comp	# of Cont	Container Type	Pres	servation	Analyses
126117	0535	32	-18-F2	Aqueous	6	1	Plastic - Pint	ı	NONE	Total Lead/DW
	0541	32	19-F2	Aqueous	6	1	Plastic - Pint	ı	NONE	Total Lead/DW
V	0548	32	21-F2	Aqueous	6	1	Plastic - Pint	ı	NONE	Total Lead/DW
1/26/17	0532	32	-5L	Aqueous	G	1	Plastic - Pint	1	NONE	Total Lead/DW
				Aqueous		1	Plastic - Pint	1	NONE	Total Lead/DW
				Aqueous		1	Plastic - Pint		NONE	Total Lead/DW
				Aqueous		1	Plastic - Pint	1	NONE	Total Lead/DW

	For Laborato	ry Use Only	Sampled by (Name - Print)	Client Remark	s/Comments	
Ice	Custody	Lab Comments	Luke Hall	Rush	24-hr TAT	
	Seals		Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time
Y/N	WN	1	91	24/17 1202	Ahllo San	9126/17
			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time
Blank/Co	oler Temp		Philip Show	1/26/17 124		
			Relinquished by: (SIGNATURE)	Date Time	Received by: (SIGNATURE)	Date Time
					C. Dunles	12:41